

论文

NFL:一种基于活动流参数估计的自适应模糊AQM算法

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摘要:

针对主动队列管理(AQM) 机制面对动态突变的网络存在参数配置难问题, 提出一种将模糊AQM和活动流参数估计策略相结合的自适应AQM算法(NFL). 在综合权衡各性能指标的基础上, 设计了一组能适应一定网络变化的模糊规则, 并对算法进行了运算优化. 为捕获网络突发流, 引入了一种基于Bloom 滤波器的无状态维护活动流参数估计策略, 并依此提出一个模糊AQM输出增益补偿器. 实验结果表明, NFL 能较好地适应网络变化, 相对其他算法, 具有更快的收敛速度和稳定的稳态队列控制性能.

关键词: 拥塞控制 主动队列管理 模糊逻辑 Bloom Filter

NFL: An Adaptive Fuzzy-logic-based AQM Algorithm with Active-flow Parameter Estimation

Abstract:

For the problem that the active queue managements(AQM' s) parameters configuration is difficult, especially in the dynamic network, an adaptive AQM algorithm (called NFL) is proposed, which is composed of two main parts: the fuzzy AQM and the active-flow estimation strategy. Considering the tradeoff among each performance indicators, a set of fuzzy rules are built for NFL to adapt to the dynamic network situation. Furthermore, an optimization method is raised, which reduces the computational complexity of fuzzy AQM. Then, a stateless active-flow estimation strategy baesd on Bloom filter is introduced to capture network congestion status. According to this, an output gain compensator for fuzzy AQM in accordance with active-flow-number parameter is proposed. Simulation results show that NFL is adaptive to dynamic network with fast convergence rate and stable steady-state queue control performance, and the comprehensive performance of NFL is more excellent than other AQM algorithms.

Keywords: Congestion Control AQM Fuzzy logic Bloom Filter

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